Small Business Innovation Research/Small Business Tech Transfer

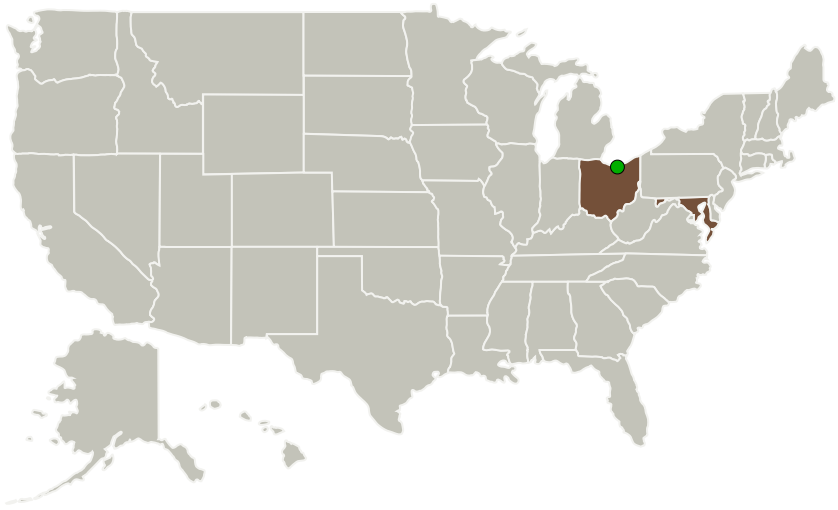
ESPRIT: Exercise Sensing and Pose Recovery Inference Tool, Phase I

Completed Technology Project (2011 - 2011)

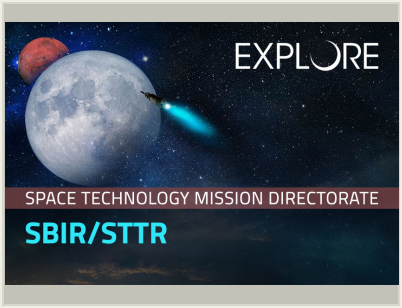
Project Introduction

We propose to develop ESPRIT: an Exercise Sensing and Pose Recovery Inference Tool, in support of NASA's effort in developing crew exercise technologies for astronaut health and fitness. ESPRIT is a single camera system that monitors the exercise activities of the crew, detects markers placed on the body and other image features, recovers 3D kinematic information of the human body pose, and compiles statistical data about the exercise activities. There are two main challenges for motion capture using a single camera: (1) lack of depth information, and (2) partial occlusion of parts of the body. To overcome these challenges, the proposed framework relies on strong priors on human body pose, shape, and motion dynamics to resolve pose ambiguities. Besides marker locations, it extracts other image features that provide additional cues for recovering pose. It combines both discriminative and generative approaches to achieve robust pose estimation and tracking performance.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Intelligent Automation, Inc.	Lead Organization	Industry	Rockville, Maryland
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



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Primary U.S. Work Locations	
Maryland	Ohio

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140239)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Intelligent Automation, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

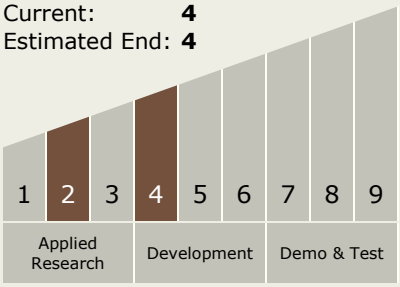
Carlos Torrez

Principal Investigator:

Mun Wai Lee

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
    - TX06.3.2 Prevention and Countermeasures

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System